Document No. FCF-PO-PLAN-0015
Revision A

Fluids and Combustion Facility Document

Preliminary Design Review Plan For the Fluids and Combustion Facility

Date: November 30, 2000

Approved by Stephen N. Simons, Deputy Chief, Microgravity Science Division, 6700

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NASA - Glenn Research Center
Cleveland, OH 44135

Signature Page

(Official signatures on file with the FCF Project Control Specialist)

Prepared By:

Dennis W. Rohn
FCF Chief Engineer
Glenn Research Center

Timothy J. Ruffner
FCF Avionics Lead Engineer
Glenn Research Center

Concurred By:

Robert L. Zurawski
FCF Project Manager
Glenn Research Center

John D. Taylor
Chief, Engineering Design and Analysis Division
Glenn Research Center

Daniel J. Gauntner
Chief, Systems Engineering Division
Glenn Research Center

Approved By:

Stephen N. Simons
Deputy Chief, Microgravity Science Division
Glenn Research Center

Change Record

Rev.	Effective Date	Description
Initial Release	9/6/00	Initial release
A	11/27/00	Updated schedule in Attachment 1 Added information in Attachments 3 and 5 Clarified the RID process explained in paragraph 3.3 Updated the deliverables noted in Attachment 4 Revisions made out of Board ; updated Table of Contents, miscellaneous formatting and vocabulary changes.

TABLE OF CONTENTS

1.0 INTRODUCTION

This document describes the ISS Fluids and Combustion Facility (FCF) Preliminary Design Review (PDR) objectives, requirements and process.

1.1 Purpose

The FCF PDR is a key milestone in the FCF project that will demonstrate that the FCF hardware and software preliminary designs are of sufficient detail to allow project progression to the detailed design portion of the project implementation phase as defined in NPG 7120.5A, NASA Program and Project Management Processes and Requirements. The PDR is called-out as a milestone review in FCF-PO-PLAN-0001, ISS Fluids and Combustion Facility Project Plan. The PDR will be conducted as defined herein and according to FCF-PLN-0022 and NAS3-99155.

The PDR will be used to evaluate the capability of the integrated FCF preliminary design to meet the payload performance, interface, safety, science and operations requirements, and to obtain agreement and approval for the proposed design approach. Specifically, the FCF PDR should:

- Demonstrate that the FCF preliminary design will meet the envelope of fluids and combustion science requirements, as defined in the Science Requirements Envelope Document, including Level 1 SRED performance and throughput requirements
- Demonstrate that the FCF preliminary design meets system requirements with acceptable risk, that system requirements have been appropriately allocated to the FCF segment, rack and package levels, and that verification plans are consistent with overall system requirements
- Establish the operability of the proposed design approach and demonstrate compliance with applicable safety, reliability, human factors (including astronaut interface) and quality assurance requirements
- Address the ISS resource needs versus availability for the FCF.
- Provide evidence, through appropriate modeling and analysis efforts, that the FCF preliminary design will satisfy actual science requirements of fluids and combustion payloads to fly in FCF, especially initial LMM (Light Microscopy Module) and MDCA (Multi-User Droplet Combustion Apparatus) experiments planned for FCF.
- Establish interface compatibility between the FCF, its various on-orbit elements (i.e., CIR, FIR, SAR), the International Space Station (ISS), fluids and combustion payload equipment to be operated in the FCF, FCF ground systems, the FCF operations control center (i.e., GRC TSC), and other interfacing items.
- Establish intrafacility interface compatibility between racks.
- Present the integrated FCF system preliminary design, with emphasis on FCF common design features/elements; including the CIR preliminary design, FIR preliminary design and SAR conceptual design and requirements.
- Ensure that FCF project plans, management plans, acquisition strategy and controls are adequate at the PDR phase of the project for the ISS Payloads Office and Microgravity Research Program Office to grant authority to proceed with the FCF detailed design.

1.2 Scope

The FCF Preliminary Design Review will be a comprehensive and systematic assessment of the FCF preliminary design and will cover all aspects of the FCF design, architecture, requirements, interfaces, hardware, software and plans. The FCF Preliminary Design Review process will include:

1. A series of specialty engineering reviews which support and lead up to the PDR
2. Detailed review and evaluation of a range of FCF documents that constitute the FCF PDR data package
3. Panel Review at a Preliminary Design Review presentation held at GRC, and
4. Resolution of PDR data package review item discrepancies (RID) and Panel Requests for Action (RFA) to close out the PDR process. (Including previously generated RFAs from the CIR PDR)

FCF specialty engineering reviews part of the PDR will include:
A FIR Phase 1 Flight Safety Review with the Payload Safety Review Panel
Various internal FCF subsystem, package and system level reviews

The FCF PDR data package review process will include:
Detailed technical review and evaluation of FCF documentation and the FCF preliminary design documented in the data package
Review Item Discrepancy (RID) generation versus documentation
Board review and acceptance of RIDs generated against the data package

Attachment 4 provides a complete listing of the contents of the FCF PDR data package. Documents which are mandatory per SSP 50431, Program Requirements for Payload Developers, are specifically noted in Attachment 4. The data package will be made available at least thirty (30) days prior to the FCF PDR presentation for review, as shown in the Attachment 1 schedule.

The FCF PDR presentation to the Review Panel at GRC will include:
FCF System Preliminary Design Review
FCF Combustion Integrated Rack (CIR) delta-Preliminary Design Review
FCF Fluids Integrated Rack (FIR) Preliminary Design Review
FCF Shared Accommodations Rack (SAR) Conceptual Design Review
FCF Management Review (Project Plan, management plan, acquisition strategy and controls)

The FCF PDR will not include a detailed review of multi-user PI-specific payload apparatus designs (e.g., LMM, MDCA, etc.), except in relation to modeling and analysis efforts required to demonstrate that integrated configurations of FCF and payload will satisfy science requirements.

Representatives from the Johnson Space Center (JSC) ISS Payloads Office, Marshall Space Flight Center (MSFC) Microgravity Research Program Office (MRPO), Headquarters (HQ) Microgravity Research Division and Board Members external to the FCF project (e.g., fluids/combustion science representatives, ISS crew, payload representatives, etc.) are expected to participate in the review to assure that their needs are properly represented in FCF plans and in the FCF preliminary design.

1.3 Reference Documents

Document Number	Document Title
FCF-PO-PLAN-0001	ISS Fluids and Combustion Facility Project Plan
FCF-PLN-0022	FCF Preliminary Design Review Plan (FCF prime contractor's PDR Plan)
GRC-W6000.002	Project Implementation Reviews
NPG 7120.5A	NASA Program and Project Management Processes and Requirements
NAS3-99155	Statement of Work Section 5.2.1
SSP 50431	Program Requirements for Payload Developers

2.0 FCF PDR TEAMS AND BOARDS

2.1 FCF PDR Data Package Review Team Membership

The FCF PDR Data Package Review Teams are led by GRC government personnel in management or senior technical positions. Team Leads are responsible for obtaining the necessary expertise for thorough review of the documentation. Membership on the teams includes technical specialists and/or scientists associated with the FCF, as well as contractor or government personnel not associated with the FCF project. GRC reviewers are from the GRC Engineering and Technical Services Directorate, the GRC Office of Safety and Assurance Technology, and the GRC Microgravity Science Division. Contractor specialists and/or other government personnel such as members of the LMM and MDCA projects are included in the PDR data package review teams, as required, to ensure comprehensive technical review at PDR. Technical representatives from the prime contractor are also invited to participate on the teams. Teams are organized by major technical disciplines and functional area. The Review Teams, Team Leads, and FCF Team Liaisons are identified in Attachment 2. The Operations/Integration/ISS Interfaces Team is expected to include expertise and relevant inputs for the Active Rack Isolation System (ARIS) and ISS integration.

2.2 Pre-Board Membership

The FCF Pre-Board will be chaired by the Engineering and Technical Services Directorate FCF Chief Engineer. The Pre-Board will include the Data Package Review Team Leads plus the Deputy Project Manager and a secretary.

2.3 Board Membership

The FCF Board will be chaired by the Deputy Chief, GRC Microgravity Division, as the Convening Authority for the PDR and will include the FCF Project Manager and the FCF Deputy Project Manager and a secretary. Per GRC-W6000.002, the Convening Authority will select the Review Panel Chairperson, approving selection of the members of the Review Panel, issue a memorandum that officially convenes the Review Panel, and approve the Project Manager's written response to the Review Panel addressing the disposition of the Review Panel's findings and recommendations.

2.4 Review Panel Membership

The FCF PDR Review Panel will be per appointment by the Convening Authority of the PDR. Per GRC-W6000.002, the Panel shall be comprised of representatives from science/technical, engineering, and safety/assurance. The Panel will include senior managers from GRC, MSFC and JSC, senior fluids/combustion scientists from academia and other representatives, as selected by the Chairperson and appointed by the Convening Authority. The FCF PDR Review Panel membership is shown in Attachment 3.

3.0 FCF PDR PROCESS

3.1 Initial Screening of Documents

Prior to the PDR Data Package Review Kick-Off Meeting, the Contractor's PDR Data Package, containing all PDR deliverables, will be delivered from the Contractor to the Government for initial screening to determine if each document is suitable to be entered into the formal PDR document review process. FCF Project members, usually the FCF Team Liaisons, will be assigned responsibility for providing an initial assessment of the preparedness of each document. Each responsible person will send an e-mail message to the FCF Chief Engineer stating that the documents reviewed are either satisfactory or unsatisfactory to be entered into the PDR Data Package and become available to all reviewers. If a document is found to be unsatisfactory (for example, it has major content deficiencies), the person who screened the document will coordinate with the Project Manager and FCF Chief Engineer to determine if the document will be returned to the document author and omitted from the PDR Data Package. FCF Project Manager decisions will be final. The FCF Project Manager has authority to adjust the PDR schedule based on contractor preparedness for PDR based on screening data submittals.

3.2 PDR Data Package Review Kick-Off Meeting

The FCF PDR Data Package review activities will be initiated with a kick-off meeting presented by the FCF Chief Engineer. The purpose of this meeting will be to discuss the logistics of the PDR process, answer questions, distribute data packages, provide a systems overview, and identify FCF system level issues which are in work. All review Team Leads should attend the PDR Kick-Off Meeting. Review team members, non-GRC, contractor, ISSP and PDR Review Panel member representatives are invited to attend. By the day of the Kick-Off Meeting, the PDR Data Package (including the RID Form) will be available via the FCF PDR Web site to the Review Teams and external reviewers for RID generation.

3.3 Individual and Team Document Review Process

Review Team Leads are responsible for obtaining support and assigning specific responsibilities for individual document review for the documents assigned to their teams. (Others not specifically requested to review the documentation may also do so by accessing the PDR Web site. This review process may include informal discussions and/or interviews with the appropriate technical personnel on the FCF contractor's development team.)

A RID should be written when the reviewer determines that the design does not meet a requirement, that subsystems are not compatible with each other, that an interface issue exists or when essential information has been omitted. As a general rule, RIDs should be written only for the most significant technical issues and discrepancies found during review. RIDs should be submitted via the RID Database available at the FCF PDR web site.

Team Leads will access the RID Database to screen RIDs assigned to them to ensure that technical issues identified are clearly stated and understood. Team Leads may combine similar RIDs with approval from the RID authors. After screening by the Team Leads, each RID will be assigned a unique number and forwarded to the document author for formal response. At this time, the RID will be tracked as an official RID by the RID Database Administrator.

When a RID is returned with a response from the document author, the RID initiator and the Team Lead will review the author's response for clarity. The Team Lead will then assign a RID Type and bring the RID forward to the Team Meetings for dispositioning. Type III RIDs should be dispositioned by consensus in the Team Meetings and then signed and dated by the Team Leads. Teams will recommend a disposition for Type I, II, and IV RIDs (see Section 4.0) which are to be presented at the Pre-Board RID screening meeting with a summary of the team's activities. If a document author provides a response to a RID and the review team disagrees with the response, then the following steps will be taken:

- the review team will do a quick iteration with the document author to determine if there was a misunderstanding and the issue can be resolved.
- if the review team agrees with the RID, but does not accept the author's response, then the issue is bumped to the Pre-Board. The Pre-Board is given the opportunity to disposition the RID.
- if the Pre-Board agrees with the RID, but does not accept the author's response, the the RID is bumped to the Board for disposition.

The overall RID process is illustrated in Attachment 6.

The teams may reject some RIDs. Any rejected RID will be shown to the Pre-Board if requested by the RID initiator, or by the Pre-Board. In addition, the Team Leads have the option of converting certain RIDs into non-RID actions.

The PDR teams will continue to function until the FCF Project Manager has approved all RID actions.

3.4 RID Administration Functions

The FCF Project Support Specialist will serve as the RID data base administrator for the FCF PDR. The RID administrator will support the Team Leads and FCF Chief Engineer by providing for the RID process administration, including RID logging, RID tracking, and RID closure. The RID administrator will also provide RID status reports and maintain the review quality records.
The RID data base administrator will serve also as secretary for Pre-Board and Board reviews at PDR and will generate minutes from these reviews.

3.5 Pre-Board Activity

The PDR Pre-Board will convene as specified on the PDR schedule shown in Attachment 1. All Team Leads will be present and team members may attend.

The Pre-Board will review the recommended RID disposition for each RID brought to the Pre-Board and establish a final disposition for all Type II and Type IV RIDs. All dispositioned RIDs will be dated and signed by the FCF Chief Engineer as the Pre-Board Chair. The Pre-Board may also request the review of any other RIDs, including disapproved RIDs. A Pre-Board recommended disposition will be documented for all Type I RIDs for presentation to the Board.

3.6 PDR Board Activity

The PDR Board will convene as specified on the PDR schedule shown in Attachment 1 with the MSD Deputy Division Chief serving as the Board Chair. All Type I RIDs will be dispositioned, signed, and dated at the Board. Final actions and assignments for RID closure will be established.

3.7 PDR Review Panel Activity

The FCF PDR Review Panel will serve as the primary review body at the FCF PDR Presentation. The Review Panel will develop a consensus of findings, concerns, and recommendations, including the request for disposition of all RFAs turned in by a consensus of the Panel. A formal panel report will be submitted to the FCF Project Manager and the Convening Authority for the PDR within one month following the PDR, identifying significant findings based on the PDR review. The findings of the Review Panel are considered advisory until the Project Manager and Convening Authority respond to them.

3.8 PDR Completion

The FCF PDR will be considered complete when the FCF Project Manager has approved all assigned RID actions, documents have been returned with approval/disapproval notification to the FCF prime contractor within 30 days of the PDR, the PDR Review Panel Report has been received, RFAs have been accepted by the FCF Project Manager, PDR results have been presented to the Microgravity Research Team, and Authority to Proceed has been formally requested. RID and RFA closeout activities will continue per the RID/RFA instructions and will be coordinated with the RID Data Base Administrator. Where possible, closure should be targeted to occur no later than 45 days from when the RID/RFA was assigned. All Type I and Type II RIDs and RFAs generated at the FCF PDR must be closed before the FCF CDR and will be formally statused at interim major FCF element (i.e., rack) milestone reviews.

4.0 CATEGORIES AND GROUNDRULES FOR THE PDR RIDS

A RID is utilized to record issues found with the project documentation. Each approved RID becomes an official project commitment to correct the deficiency. They will be categorized as follows:

4.1 Type I RIDs

Type I RIDs are those that have cost or schedule impact, and normally represent a significant change in design or planning.

4.2 Type II RIDs

Type II RIDs involve changes in design implementation or planning, but do not impact cost or schedule. Normally a Type II RID is of a technical nature and may require some additional design or analysis effort.

4.3 Type III RIDs

Type III RIDs represent concerns or issues which do not identify a deficiency in meeting project requirements or planning, but which should be corrected in future submittal of documentation, such as typographical errors, grammar, style, format, clarification, and other suggestions for improvement of the documentation.

4.4 Type IV RIDs

Type IV RIDs identify a missing document or other information that is necessary to demonstrate that the design is compliant with a particular requirement or set of requirements. Type IV RIDs may be dispositioned at the Pre-Board.

4.6 RID PROCESSING

All RIDs will be submitted electronically via the PDR Web site.

The numbering system for the RIDs will be explained at the Kick-Off Meeting.

Each RID must reference the applicable requirements document and the specific paragraph within the document that the system design or planning is violating.

A RID must show that the design does not meet a requirement, subsystems are not compatible, or required information is missing.

An addition of, or a change in, requirements is a valid basis for a RID if such action is required for the system to meet its interface, safety or performance requirement.

Team leads should evaluate the appropriateness of all RIDs. If a team leader determines that a RID is inappropriate, every effort should be made to resolve the issue or concern with the originator and have the RID withdrawn. At any time, a RID originator may withdraw his/her RID by informing the RID Database Administrator and the appropriate Team Lead.

RIDs from outside the identified review teams will be accepted. All such RID submittals will be processed by the appropriate team. The Chief Engineer or Team Leads may disapprove a RID if it is judged to be inappropriate, but the RID initiator may request that the disapproved RID be presented to the FCF Pre-Board.

4.7 RID Close-Out

For RIDs dispositioned by the review teams, the Pre-Board, and/or Board, an action will be assigned on the RID form. The action closeout will be processed as follows:

1. When the action has been completed, the FCF prime contractor will document the implementation in Block 18, notify the RID initiator by e-mail (including an attachment of the implemented change), and send a cc e-mail to the RID Data Base administrator.
2. If the RID initiator concurs with the implementation, he/she will notify the FCF Chief Engineer by e-mail, with cc to the RID data base administrator. The FCF Chief Engineer will provide RID closure approval. If the RID initiator does not concur with the implementation, the RID will remain open until the RID initiator concurs or the FCF Project Manager approves closure of the RID.
3. The FCF Project Manager will concur on RID closure approval.

5.0 PDR PRESENTATION

The FCF PDR Presentations will overview the FCF Preliminary Design and include briefings and descriptions of the FCF, CIR, FIR, SAR and ground systems. The presentations will be open to PI teams, FCF project team members, PDR Review Panel members, visitors from SSPO, MRPO, Headquarters and other participants. The PDR presentation will include the following presentations:

Introduction and Overview
FCF System Preliminary Design (Flight and Ground Segments)
CIR Delta Preliminary Design Review
FIR Preliminary Design Review
SAR Conceptual Design Review
Initial Payload Integration, Operations and Utilization Plans
Management Discussions – Project Plans, Risks, Budget, Schedule

5.1 Requests for Action Generation

Requests for Action (RFA) will be accepted from PDR Review Panel Members. These RFAs shall identify the most significant issues and/or review item discrepancies found in review of the FCF Preliminary Design at the PDR Presentations and/or PDR Data Package review. RFAs to the FCF Project generated at PDR shall be submitted for project action with the PDR Review Panel Report. All RFAs shall reflect a consensus of the PDR Review Panel. The RFA form is accessible to the Review Panel members via the FCF PDR web site and will also be provided on paper at the Review.

5.2 PDR Review Panel Report

The PDR Review Panel Chairperson shall prepare and submit a Formal Report from the FCF PDR Review within 30 days following completion of the PDR presentations. The Review Panel report is to be a written report with a cover memorandum signed by all Review Panel members, transmitting the Review Panel Report to the Convening Authority and FCF Project Manager. The report shall include; 1) General (e.g. date of review and Review Panel members), 2) Charter (objectives as stated in the appointment letter), 3) Findings, 4) Concerns, 5) Recommendations, and 6) Requests for Action.

The formal Review Panel report shall respond to the objectives of the review that were documented in the charter provided in the appointment letter. All significant findings relative to those objectives shall be documented. A specific written recommendation shall be made for each objective. These recommendations shall reflect the consensus opinion of the Review Panel members, derived during their discussions following the reviews. Recommendations can be conditioned, as long as the conditions are stated clearly. Any significant concerns that the Review Panel wishes to express shall also be documented in the report.

The report shall contain all final RFAs generated and agreed to by consensus of the PDR Review Panel at the review. The report may also contain individual reports from each Panel Member. The GRC Microgravity Science Division Manager, JSC Space Station Payloads Office Manager, MSFC Microgravity Research Program Office Manager, and Headquarters Microgravity Research Division Manager shall be copied on distribution when this report is issued.

5.3 RFA Closeout

1. When the action has been completed, the FCF prime contractor will document the implementation to the PDR Review Panel Chairperson by e-mail (including an attachment of the implemented change), and send a cc e-mail to the FCF Project Support Specialist.
2. If the PDR Review Panel Chair concurs with the implementation, he/she will notify the FCF Project Manager by e-mail, with cc to the FCF Project Support Specialist (i.e., PDR Data Base Administrator). Otherwise, the RFA will remain open until the PDR Review Panel Chair concurs with the implementation.
3. The FCF Project Manager and Convening Authority will provide closure approval on all RFAs.

ATTACHMENT 1

FCF PDR Schedule

September 11, 2000	FIR Phase 1 SCDP to GRC for Review
September 22, 2000	FIR Phase 1 SCDP to PSRP
October 27	FDC delivers PDR Data Package
October 30 - November 2	GRC initial screening of PDR documents
November 9	PDR Kick-Off Meeting; Part 1 data package items available to external reviewers
November 9 – December 22	RID submittals for Part 1 documents (see Attachment 4)
November 13 - 16	Subsystem level Table Top Reviews
December 12 - 14	FDC delivers PDR briefing to GRC and performs Dry Run In System Level tabletop review
December 22	FDC submits Part 2 data package items to GRC
December 29 – January 22	RID submittals for Part 2 documents (see Attachment 4)
January 19	Submit PDR presentation package to Review Panel
January 23 – 25	RID Screening by Review Team Leads
January 26 – February 4	RID responses by document authors
January 30 – 31	FIR Phase 1 Flight Safety Review
February 5 – 6	Data Package Review Team Meetings
February 7	Pre-Board Meeting
February 8	Board Meeting
February 13 – 16	PDR Stand-Up Presentation to Review Panel
March 2001	Panel Report and RFAs received
March 2001	PDR results presented to the MRT
April 2001	Lead Center PMC presentation requesting Authority to Proceed (ATP)

ATTACHMENT 2

FCF PDR Data Package Review Teams

Team #1 -- Systems

Team Lead: M. Forkosh
FCF Team Liaison: D. Rohn

Areas of review:
Systems Engineering
System Requirements and Interfaces
Configuration Management/Data Management
Logistics and Maintenance
Environments
Contamination Control
Systems Verification
Physical Assembly, Integration and Test

Team #2 -- Structures/Mechanical

Team Lead: M. Liao
FCF Team Liaisons: C. Denniston

Areas of review:
Structural Design
Mass Properties
Layout/Assembly
Dynamics
Stress/Fracture Control
Mechanisms/MGSE
Loads
Acoustic Noise
Microgravity

Team #3 Fluids/Thermal

Team Lead: D. Edwards
FCF Team Liaison: D. Edwards

Areas of review:
Thermal
Pressurized systems
Fluid systems
Fire Detection and Suppression
VES/VRS
Venting

FCF PDR Data Package Review Teams (continued)

Team #4 -- Avionics/Power

Team Lead: D. Emerson
FCF Team Liaisons: T. Ruffner

Areas of review:
Electrical Systems and Power
EGSE
CDMS/C&DH
Instrumentation
Video

Team #5 -- Software

Team Lead: D. York
FCF Team Liaison: J. Ponyik

Areas of review:
Flight Software
Ground Software
Software Test and Validation

Team #6 -- Integration/Operations/ISS Interfaces (IOI)

Team Lead: T. St. Onge
FCF Team Liaisons: J. Free, D. Malarik, M. Nall

Areas of review:
Human Factors Engineering
Ground Systems
Ground Processing
System and Payload Integration
Operations
Training/Crew Systems
Ground Support Infrastructure

Team members include:
Payload Integration Manager
Boeing/ARIS representatives
Research Program Office

FCF PDR Data Package Review Teams (continued)

Team #7 -- Safety and Mission Assurance

Team Lead: G. Kelm
FCF Team Liaison: B. Patel

Areas of review:
Safety
Reliability
Quality
Materials
Software Quality

Team #8 -- Combustion Science/Payloads

Team Lead: A. Otero
Science/Payload Team Liaisons: K. Weiland/T. O'Malley

Areas of review:
Combustion PI interfaces and accommodations
Combustion science compliance (assessment by scientists)
Combustion experiment models, incl. Resource assessments
Diagnostics

Team #9 -- Fluid Science/Payloads

Team Lead: N. Shaw
Science/Payload Team Liaisons: M. Hill/F. Gati
Areas of review:
Fluids PI interfaces and accommodations
Fluids science compliance (assessment by scientists)
Fluids experiment models, incl. Resource assessments
Diagnostics

Team #10 -- Management Review

Team Lead: D. Francisco
FCF Team Liaison: R. Corban

Areas of review:
Program management
Project planning
Project control
Financial/resources
Independent cost estimate
Schedule

ATTACHMENT 3
FCF PDR Pre-Board, Board, and Panel Membership

FCF PDR Pre-Board Membership

Chairpersons:

7800	Dennis Rohn
6700	Robert Corban

Members:

PDR Data Package Review Team Leads

Secretary: Debbi Sedlak

FCF PDR Board Membership

Chairperson:

6700	Steve Simons

Members:

6700	Robert Zurawski
6700	Robert Corban

Secretary: Debbi Sedlak

FCF PDR Review Panel Membership

Chairperson:

Dr. Thomas Labus	Deputy Director, National Center for Microgravity Research on Fluids and Combustion

Members:

Ken Adams	Chief Engineer, GRC Office of Safety and Assurance Technologies
Dan Gauntner	Deputy Chief, GRC Systems Engineering Division
Robert Jenkins	TDRS Project Manager, Goddard Space Flight Center
Mike Miller	ISS Payloads Office
Don Thomas	Astronaut, Crew Office (JSC)

FCF PDR Review Panel Membership (cont'd.)

Paul Gilbert	MSFC Payloads Operations and Integration
Dr. G. Paul Neitzel	Chairman, Fluids Working Group
Dr. Chung K. (Ed) Law	Chairman, Combustion Working Group

ATTACHMENT 4
FCF PDR Data Package Items

Note about the "Comments" column: If FCF, FIR, CIR, or SAR appears in this column, it indicates that a separate document is provided for each item. "Reference" indicates that this document provides reference information for the review and is not part of the PDR package.

Deliverables	Review Team	SSP 50431 Mandatory	Comments
GOVERNMENT DOCUMENTS			
FCF Project Plan	Management	X	FCF
FCF Risk Management Plan	S&MA	X	FCF
FCF Configuration Management Plan	Management		FCF
FCF Product Assurance Plan	S&MA	X	FCF
FCF Software Management Plan	Software		FCF
EPCU ICD	Avionics		FCF
Life Cycle Cost Estimates	Mgt/Systems		FCF
Technical Performance Measurement Plan & Report	N/A		REFERENCE
Combustion Science Reqmts. Doc – DCE-2	N/A		REFERENCE
CIR PDR Agenda and Meeting Minutes	N/A		REFERENCE
Science Requirements Envelope Document	N/A		REFERENCE
Fluids Science Requirements Documents (Experiment-Specific)	N/A		REFERENCE
Combustion Multi-user Engineering Requirements Documents -- MDCA	N/A		REFERENCE
Safety Review Agenda/Minutes, Phase 1, FIR	N/A		REFERENCE
Exhibit 1 Statement of Work and CDRL	N/A		REFERENCE
CONTRACTOR DOCUMENTS-Part 1			
Acceptance Plan	Systems		CIR, FIR
Acoustic Control Plan	Structures	X	FCF
Baseline Concept Description (BCD Main Body)	System/Fluid/Comb		FCF
Baseline System Description (BSD)	System/Fluid/Comb		CIR, FIR, SAR
Compliance Matrix (FCF/ISS)	Systems		FCF
Configuration Management Plan	Management		FCF
Contamination Control and Implementation Plan	S&MA		FCF
Documentation Tree	Systems		FCF
Drawing Tree	Systems		FCF, CIR, FIR
Drawing Tree, Command and Data Management	Avionics		FCF
Drawing Tree, Environmental Control Subsystems	Thermal		FCF
Drawing Tree, Structural Subsystems	Structures		FCF

Deliverables	Review Team	SSP 50431 Mandatory	Comments
EEE Parts Control Plan	Avionics		FCF
Electromagnetic Interference Compatibility Plan	Avionics	X	FCF
Failure Modes and Effects Analysis, FOMA	S&MA		CIR
Failure Modes and Effects Analysis, IOP	S&MA		CIR
Failure Modes and Effects Analysis, IPP	S&MA		CIR
Failure Modes and Effects Analysis, Optics Bench	S&MA		CIR
Fastener Control Plan	Structures		FCF
Fracture Control Plan	Structures	X	FCF
Ground Processing Plan	IOI		FCF
Integrated Logistics Support Plan (ILSP)	IOI	X	FCF
Interface Control Document, Rack-to-ISS	IOI	X	CIR, FIR
Interface Definition Document (IDD)	IOI		CIR, FIR
Mass Properties Control Plan	Structures		FCF
Mass Properties Report	Structures		FCF
Material Identification and Usage List (MIUL)	S&MA		CIR, FIR
Materials and Processes Selection/Control Plan	S&MA		FCF
Microgravity Control Plan	Structures	X	FCF
Payload Integration Agreement	IOI	X	FCF
Payload Integration Management Schedule	IOI	X	CIR, FIR
Reliability/Maintainability Plan (incl. FOMA analysis)	S&MA	X	FCF
Safety Compliance Data Package, Flight, Phase 1	S&MA		FIR
Simulator Definition Document	IOI		CIR, FIR
Software Assurance Plan	Software		FCF
Software Reqmts. Doc., IOP CANbus Processor	Software		FCF
Software Reqmts. Doc., IOP HRDL Processor	Software		FCF
Software Reqmts. Doc., IOP Main Processor	Software		FCF
Structural Design/Verification Plan	Structures		FCF
System Safety Plan	S&MA/Systems		FCF
Design Data Package	Various		FCF, CIR, FIR, SAR
Engineering Drawings/Schematics	Various		CIR, FIR, SAR
CONTRACTOR DOCUMENTS-Part 2			
Applicable Standards List	Systems		FCF
Compliance Matrix (Science Requirements)	System/Fluid/Comb		CIR, FIR
Compliance Matrix (FCF System)	System/Fluid/Comb		FCF
Engineering Model Dev./Qual. Test Plan	Systems		CIR, FIR
Ground Segment System Specification	IOI		FCF
Master Verification Plan	Systems		FCF
Limited Life Items List	Systems	X	CIR, FIR

Deliverables	Review Team	SSP 50431 Mandatory	Comments
Payload Verification Plan	Systems	X	CIR, FIR, SAR
Payload Verification Plan Waivers	Systems	X	CIR, FIR
Product Assurance Plan	S&MA		FCF
Reliability Report	S&MA		CIR, FIR
Risk Management Plan (Contractor's Plan)	Mgt/Systems		FCF
Safety Critical Structures Data Package	S&MA		CIR, FIR
Software Configuration Management Plan	Software		FCF
Software Development/Management Plan	Software		FCF
Software Interface Control Document	Software	X	FCF
Software Requirements Document	Software		FCF
Software Requirements Document, ATCSC	Software		FCF
Software Requirements Document, Common IPSU	Software		FCF
Software Requirements Document, DCM	Software		FCF
Software Requirements Document, FCU	Software		CIR
Software Reqmts Doc, FCU CANbus Processor	Software		CIR
Software Requirements Document, FSAP	Software		FIR
Software Requirements Doc, IOP Video Switch	Software		FCF
Software Requirements Document, ITI IPSU	Software		CIR
Software Reqmts Doc, ITI IPSU CANbus Processor	Software		CIR
Software Requirements Document, WTCSC	Software		FCF
Specification, Design-to	Systems		CIR, FIR, SAR
Specification, System	Systems	X	FCF
Payload Development Schedule	Mgt/Fluid/Comb	X	CIR, FIR, SAR
Quality Assurance Plan	S&MA	X	FCF

ATTACHMENT 5

FCF PDR Mailing List

HQ

Brad Carpenter
Roger Crouch
Mickey King
Gerald Pitalo
Judee Robey
Gene Trinh

ISS/JSC/SSPO

Rick Nygren
Dr. Neal Pellis
Mick Culp
John H. Temple
Craig Spease
Michael D'Onofrio

MSFC/MRPO

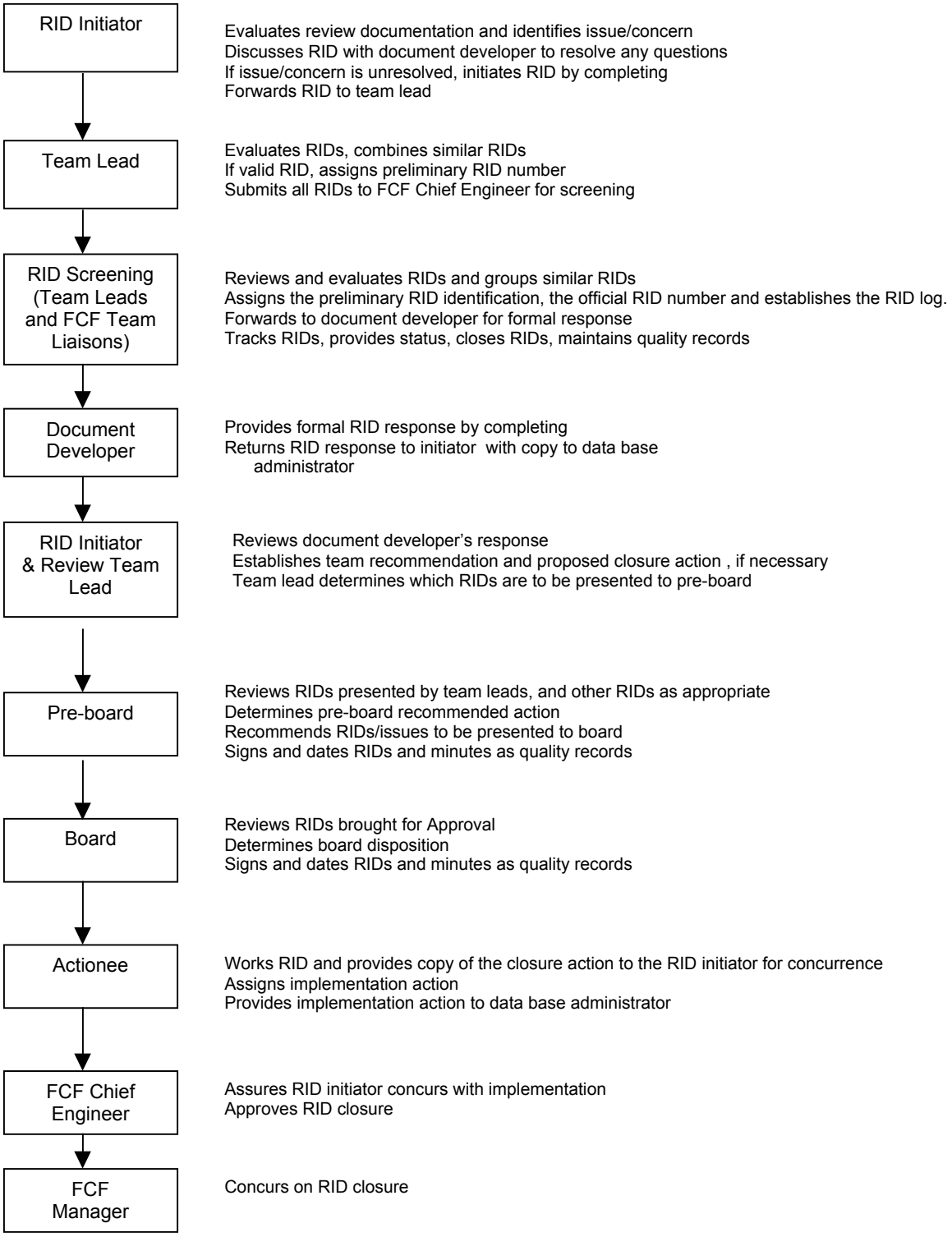
Robin Henderson
Bill Ramage
Dewayne Collins
Ronald Schlagheck
Thomas Stinson
Jim Sykes

Internationals

Irajá Bandeira/INPE/Brazil
Gerard Cambon/CNES/France
Christian Eigenbrod/ZARM/Germany
M.arc Heppener/ESA/ESTEC/Netherlands
Rodney Herring/CSA/Canada
Jens Koenig/ZARM/Germany
Ewald Kufner/ESA/ESTEC/Netherlands
Rainer Kuhl/DLR/Germany
Olivier Minster/ESA/ESTEC/Netherlands
Horst Mundorf/ESA/ESTEC/Netherlands
Makoda Natsuisaka/NASDA/Japan
Y. Osipiyan/Russian Academy Science/Russian Federation
P. Preu/German Aerospace Center/DLR/Germany
Guiseppe Reibaldi/ESA/ESTEC/Netherlands
Jean Sabbaugh/ASI/Italy
Shinichi Yoda/National Development Agency/Japan
Bernard Zappoli/CNES/France

ATTACHMENT 6

RID Processing Flow



ATTACHMENT 7

Acronyms

ARIS	Active Rack Isolation System
C&DH	Command and Data Handling
CDMS	Command and Data Management System
CDR	Critical Design Review
CIR	Combustion Integrated Rack
EMI/EMC	Electromagnetic Interference/Electromagnetic Compatibility
FCF	Fluids and Combustion Facility
FIR	Fluids Integrated Rack
GRC	Glenn Research Center
ICD	Interface Control Document
ISS	International Space Station
ISSP	International Space Station Program
JSC	Johnson Space Flight Center
LMM	Light Microscopy Module
MDCA	Multi-User Droplet Combustion Apparatus
MIUL	Materials Identification and Utilization List
MRT	Microgravity Research Team
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
PDR	Preliminary Design Review
PIA	Payload Integration Agreement
PSRP	Payload Safety Review Panel
PTCU	Payload Training Center Unit
RID	Review Item Discrepancy
RFA	Request For Action
S&MA	Safety and Mission Assurance
SCDP	Safety Compliance Data Package
SRED	Science Requirements Envelope Document
VES	Vacuum Exhaust System
VRS	Vacuum Resource System